University of Alberta

A Comparative-Descriptive Study of the Quality of Life of Adolescents With Asthma and Adolescents With Asthma and Co-existing Generalized Anxiety Disorder

by

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Abstract

The purpose of this study was to expand knowledge in the area of the quality of life experienced by adolescents with asthma and co-existing Generalized Anxiety Disorder (GAD). Using subjects and data from a larger study, 12 adolescents with asthma diagnosed with co-existing GAD were matched for age and gender with 12 adolescents with asthma alone. The asthma-specific quality of life of adolescents in both groups was measured using their responses on the Pediatric Asthma Quality of Life Questionnaire (PAQLQ). The GAD-specific quality of life of the adolescents in the Asthma-GAD Group was measured using the GAD Interference Rating that they provided during a structured clinical interview. Statistical analyses revealed that (a) the PAQLQ differences between the Asthma and Asthma-GAD Groups were nonsignificant, (b) the Interference Ratings of the Asthma-GAD Group ranged from 1 (*a little bit*) to 8 (*very, very much*), and (c) the asthma-specific and GAD-specific quality of life of participants in the Asthma-GAD Group were unrelated. These findings are discussed and their implications considered.

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CHAPTER 1:

INTRODUCTION

Asthma is one of the most common chronic illnesses among children and adolescents living in Canada, with a reported national prevalence rate of 13% among youth aged 5 to 19 years (Health Canada, 1998). Recent reported prevalence rates for this age group in Alberta range from 12.8% to 17.0% (Hessel et al., 2001). The asthma costs relevant to health care utilization (unscheduled doctor visits and Emergency Department visits) and daily life (days lost from school, activity intolerance, and symptom experience) are substantial (Juniper et al., 1992; Osman et al., 2000; Skoner, 2001). Currently, treatment of asthma in adolescents is focused on reducing the impact of the illness. An important indicator of the impact of treatment in asthma is the person's quality of life or sense of well-being (Forrest, Starfield, Riley, & Kang, 1997; Juniper et al., 1996).

Recently it has been demonstrated that adolescents with asthma have higher prevalence rates of anxiety disorders, compared to healthy control groups (for a review see Katon, Richardson, Lozano, & McCauley, 2004). Of the anxiety disorders, the most common classification found in children and adolescents with asthma is Generalized Anxiety Disorder (GAD). Using the most recent diagnostic criteria (*DSM-IV*, American Psychiatric Association [APA], 1994), Vila, Nollet-Clemençon, Vera, et al. (1999) reported that 32% of a sample of 93 youth with asthma, aged 8 to 17 had an anxiety disorder, and the primary diagnosis in 26% of their sample was GAD. Similarly, in a European study of youth between the ages of 8 and 17, Vila, Nollet-Clemençon, De Blic,

et al. (1999) reported that 25% of a sample of 92 children with asthma had GAD. GAD is characterized by Excessive and uncontrollable worry and associated anxiety (Masi, Mucci, Favilla, Romano, & Poli, 1999). In the majority of cases, GAD is unrecognized and thus untreated in primary care settings (Wittchen, 2002). Left undiagnosed and untreated GAD in the adult population has been associated with over-utilization of health care resources and significant social disability (Wittchen, 2002). Anxiety has been shown to be a strong predictor of asthma-specific quality of life (Hommel et al., 2003). It is expected that unrecognized and untreated GAD in adolescents with asthma would compound the negative impact of both conditions on the adolescent's quality of life. To date, there has been limited study of the impact of co-existing asthma and anxiety disorder(s) on the quality of life of adolescents with asthma.

Purpose

The purpose of this study was to further expand knowledge in the area of the quality of life of adolescents with co-existing asthma and GAD. Using a sample of adolescents with asthma, the first objective of the study was to compare the asthma-specific quality of life of adolescents with asthma, and adolescents with asthma and co-existing GAD. The second objective was to examine GAD-specific quality of life of adolescents with asthma and co-existing GAD. The third objective of this study was to examine the relationship between asthma-specific quality of life and GAD-specific quality of life in adolescents with asthma and co-existing GAD.

CHAPTER 2:

REVIEW OF THE LITERATURE

The purpose of this review of the literature is to present an overview of the clinical-empirical literature pertaining to the impact of asthma and comorbid anxiety disorders, particularly GAD, on the quality of life of adolescents. Figure 1 presents a schematization of the three-way relationship among asthma, GAD, and the quality of life of adolescents.

The first section of this chapter begins with a description of asthma in general and then moves to a consideration of asthma in adolescents and the impact of anxiety on asthma. The second section of the chapter focuses on anxiety disorders in adolescents in general and then reviews the prevalence of anxiety disorders in adolescents with asthma, ending with a review of the clinical-empirical literature on GAD, the most common anxiety disorder in adolescents with asthma. The third section of the chapter focuses on quality of life, delineating between generic and disease specific quality of life, and then moving to consideration of the generic and asthma-specific quality of life of adolescents with asthma, followed by a review of GAD-specific quality of life of adolescents. It concludes with a consideration of the impact of co-existing asthma and emotional disorders on the quality of life of adolescents.

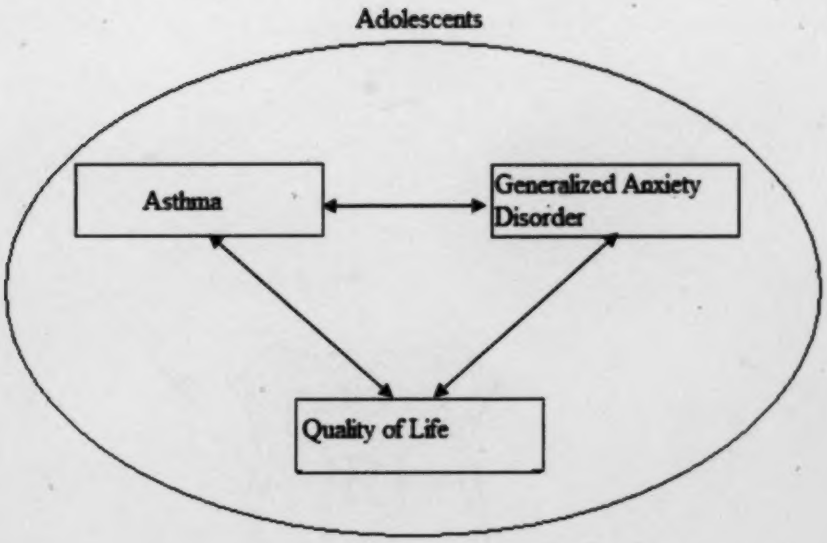

Figure 1. A schematization of the interrelationship among Asthma, GAD, and quality of life.

Asthma

Asthma is a chronic, intermittent respiratory disease typified by variable airflow and inflammation, which causes respiratory symptoms that can include coughing, wheezing, difficulty breathing, chest tightness, and increased sputum production (Boulet, Becker, Bérubé, Beveridge, & Ernst, 1999). According to Boulet et al., the variable airflow found in people with asthma is due to hyperresponsive airways and the ensuing airway inflammation. It is often caused and exacerbated by triggers or stimuli that can be either internal (e.g., emotions) or environmental (e.g., smoke).

The diagnosis of asthma is based upon a variety of factors including: a family history of asthma, a history of allergies and eczema, the presenting symptoms, the

response to treatment and spirometry measures (Boulet et al., 1999). Although spirometry is the standard for diagnosis, airflow changes are frequently intermittent, making a definitive diagnosis difficult. Treatment of asthma includes: medications to control the symptoms and airway inflammation, as well as education regarding the illness, asthma triggers, avoidance of triggers, and medication use (Boulet et al., 1999). Asthma severity varies broadly within the individual and between individuals. It is commonly rated by the frequency of symptoms and the type and amount of medications required to control the symptoms (Boulet et al., 1999). Asthma is a chronic disease that varies over time, consequently optimal asthma control requires that people with asthma learn how to monitor their symptoms, make adjustments to self-medication when necessary, and seek medical advice when appropriate.

Adolescents and Asthma

Adolescence is a time of significant physical, social and psychological growth and change (Allender, 1998). The interference created by asthma and its' self-management requirements is likely to affect the adolescent's ability to meet crucial developmental challenges. Adolescents with asthma may feel an increased dependence on family during a developmental stage when they typically try to increase their independence. A struggle for independence may lead to difficulty around assuming responsibility for medication regimens and medication compliance (Randolph & Fraser, 1999). Adolescence is a period in which individuals seek identity and intimacy and peer influences are dominant. Asthma may limit an adolescent's ability to fully participate in both sports and social activities (Skoner, 2001). Peer pressure during the adolescent period can have a significant impact on a youth's decision making, as youth strive to 'fit in' with peers and

to be accepted by their peer group (Higgins & Barrow, 1998; Randolph & Fraser, 1999). In order to be part of their peer group adolescents with asthma may make poor health choices, which negatively impact their illness. Youth with asthma may miss school due to asthma symptoms causing them to fall behind on schoolwork as well as missing time with peers (Hennessy-Harstad, 1999). Youth may experience feelings of resentment around taking medication and the asthma itself, and may display those feelings through anger and rebellion (Higgins & Barrow, 1998; Randolph & Fraser, 1999). These issues highlight the importance of health care professionals providing care that is age appropriate for adolescents.

Asthma and Anxiety

Anxiety is thought either to worsen asthma symptoms or to be caused by asthma (for reviews see Kolbe, 2002; Lehrer, 1998; Lehrer, Isenberg, & Hochron, 1993; Rietveld, Everaerd, & Creer, 2000). Several physiologic mechanisms may play a role in the relationship between anxiety and worsening asthma symptoms, including the nervous, endocrine, respiratory, and immune system mechanisms. The exact physiologic mechanisms are currently not understood. However compared to healthy individuals, people with asthma experience greater bronchoconstriction when they feel anxious (for a review see Lehrer, Song, Feldman, Giardino, & Schmaling, 2002). It is speculated that this excessive bronchoconstriction observed in people with asthma is a result of either: an exaggerated response to autonomic feedback triggered by emotion or; an exaggerated response to cooling and drying of the airway due to the breathing patterns associated with anxiety (Lehrer, 1998).

Anxiety is an expected emotional response to the frightening symptoms that are typical of asthma attacks. The individual becomes increasingly frightened and anxious as asthma symptoms are triggered. In turn, anxiety increases the bronchoconstriction, which further worsens his/her symptoms and creates a vicious cycle.

Anxiety Disorders and Adolescents

Throughout the 1980s there was a renewed research interest in examining clinical anxiety. As a result of this interest a new classification of anxiety disorders, with distinct sets of diagnostic criteria, was presented in the *Diagnostic and Statistical Manual* (*DSM-III*) of the APA (1980). These diagnostic criteria were further refined in *DSM-III R* (APA, 1987) and the *DSM-IV* (APA, 1994) versions. Changes in the anxiety disorder diagnoses resulting from these revisions are summarized and presented in Table 1.

Table 1

DSM-III (1980), DSM-III-R (1987), and DSM-IV (1994) Classification of Anxiety Disorders in Children and Adolescents

Anxiety disorders of childhood and adolescence (*DSM-III, DSM-III-R*)	Anxiety disorders of childhood and adolescence (*DSM-IV*)
Separation Anxiety Disorder	Separation Anxiety Disorder
Overanxious Disorder	Generalized Anxiety Disorder
Avoidant Disorder	Social Phobia
	Panic Disorder
	Agoraphobia
	Specific Phobias
	Obsessive Compulsive Disorder
	Posttraumatic Stress Disorder
	Acute Stress Disorder

Note. Separation Anxiety Disorder, Social Phobia, and Generalized Anxiety Disorder are the three most common and co-occurring anxiety disorders in youth (Kendall, 1994; RUPP Anxiety Study Group, 2001).

Subsequently researchers began to apply the diagnostic criteria to determine the prevalence rates in the general population of children and adolescents. As a result of that research it is clear anxiety disorders are the most common mental disorder affecting youth (Kendall & Pimentel, 2003). Of the anxiety disorders, GAD is common, with lifetime prevalence rates that range from 4.2% to 6.6% and one-year prevalence rates as high as 3.8% (Ninan, 2001).

Co-existing Asthma and Anxiety Disorders in Adolescents

More recently, there has been an interest in the prevalence of co-existing anxiety disorders in populations of children and adolescents with asthma. Several researchers have indicated that anxiety disorders are more common in youth with asthma than in

youth in the general population (Vila, Nollet-Clemençon, de Blic, Mouren-Simeoni, & Scheinmann, 2000; Vila, Nollet-Clemençon, De Blic, et al., 1999). Notably, anxiety disorders are more common in youth with asthma than in youth with other chronic illnesses such as diabetes (Vila, Nollet-Clemençon, Vera, et al., 1999). The most common anxiety disorder in youth with asthma is GAD (Vila et al., 2000; Vila, Nollet-Clemençon, De Blic, et al., 1999).

Using the most recent diagnostic criteria (*DSM-IV*, American Psychiatric Association, 1994), Vila, Nollet-Clemençon, Vera, et al. (1999) reported that 32% of a sample of 93 youth aged 8 to 17 had an anxiety disorder, and the primary diagnosis in 26% of their sample was GAD. Similarly, in a European study of youth between the ages of 8 and 17, Vila, Nollet-Clemençon, De Blic, et al. (1999) reported that 25% of a sample of 92 children with asthma had GAD. Compared to a normal control group, Vila et al. (2000) found that 82 adolescents and children with asthma had higher rates of anxiety disorders including GAD. Also, the group with asthma and anxiety disorders reported feelings of poorer social competence and lower self esteem. Feelings of social competence and self-esteem may be impacted by an anxiety disorder and influence an adolescent's ability to fit in with peers. In a multisite American study with a community sample of 1,285 youth between the ages of 9 and 17 years and their guardians, Ortega, Huertas, Canino, Ramirez, and Rubio-Stipec (2002) found a positive relationship between a history of asthma in the adolescents and an anxiety disorder.

In summary, up to one third of children and adolescents with asthma may have a comorbid anxiety disorder. As well, of the anxiety disorders among adolescents with asthma and comorbid anxiety disorders, GAD has been found to be the most prevalent.

Generalized Anxiety Disorder

GAD is characterized by significant, uncontrollable worry for a number of reasons, with worries occurring more days than not, over a six-month period of time (American Psychological Association, 1994). Additionally, the individual experiences significant interference because of the worrying in some aspect of his/her functioning. The following is the diagnostic criteria for GAD in the *DSM-IV-TR*.

A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities.
B. The person finds it difficult to control the worry.
C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some of the symptoms present for more days than not for the past 6 months). Note: Only one item is required for children.
   (1) restlessness or feeling keyed up or on edge
   (2) being easily fatigued
   (3) difficulty concentrating or mind going blank
   (4) irritability
   (5) muscle tension
   (6) sleep disturbance (difficulty falling asleep, or restless unsatisfying sleep)
D. The focus of the anxiety and worry is not confined to features of an Axis I disorder, e.g., the anxiety or worry is not about having a Panic Attack (as in Panic Disorder), being embarrassed in public (as in Social Phobia), being contaminated (as in Obsessive Compulsive Disorder), being away from home or close relatives (as in Separation Anxiety Disorder), gaining weight (as in Anorexia Nervosa), having multiple physical complaints (as in Somatization Disorder), or having a serious illness (as in Hypochondriasis), and the anxiety and worry do not occur exclusively during Posttraumatic Stress Disorder.
E. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
F. The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hyperthyroidism) and does not occur exclusively during a Mood Disorder, a Psychotic Disorder, or a Pervasive Developmental Disorder. (APA, 2000, p. 222).

GAD is a complex condition that affects both the individual's cognitive processes and the ensuing expressed physiological symptoms. This dynamic combination can lead to idiosyncratic social, personal, and academic impairment (Wagner, 2001). There is no

research published on the impact this disorder has on the lives of adolescents with the disorder.

Presentation

GAD is a chronic debilitating condition with symptoms of anxiety and worry and physical symptoms that wax and wane over time; often the disorder goes undiagnosed for years after the onset of symptoms. Not only do youth with GAD suffer from the debilitating affects of GAD symptoms, but also GAD in youth has a high rate of comorbidity with other anxiety and mood disorders (Ballenger et al., 2001; Masi et al., 1999; Wagner, 2001; Wittchen, 2002). It is important to note that, although GAD is often found comorbid with chronic medical conditions, the presence of the medical condition decreases the probability that GAD will be recognized and treated (Ballenger et al., 2001). GAD, when comorbid with a chronic medical condition, worsens the individual's prognosis (Ballenger et al., 2001). Adolescents with an anxiety disorder are more vulnerable to suicide attempts when in the course of the anxiety disorder they experience depression (Pawlak, Pascual-Sanchez, Rae, Fischer, & Ladame, 1999). Because chronic medical conditions also increase suicide risk, one can speculate that youth with asthma and comorbid GAD may be at increased risk because of the impact of these illnesses on their lives.

Quality of Life

The World Health Organization (1995) defined *quality of life* as "the individual's perception of their position in life, in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (p. 1405). Further, the WHO described quality of life as a multidimensional construct comprised of

six domains: the physical, the psychological, independence, social relationships, the environment, and spirituality. Improving the quality of life of children and adolescents with chronic conditions such as asthma has been recognized as an important goal of treatment (Curtis, Martin, & Martin, 1997; Eiser, & Morse, 2001; Jones, 1995; Juniper, 2001; McSweeny & Creer, 1995; Richards & Hemstreet, 1994). The emphasis on quality of life as an outcome measure is a result of the growing acceptance that disease and its treatment impact the individual's daily life.

Over the past two decades a number of generic and disease-specific, health-related quality of life measures have been developed to quantify the functional impairments (physical, emotional, and social) that result from chronic disease such as asthma that are considered important in the everyday lives of children and adolescents (Clarke & Eiser, 2004; Eiser & Morse, 2001; Juniper, 1998). Generic health-related quality of life measures are designed to allow comparisons of health-related quality of life between youth with and those without diseases and among youth across different diseases. Disease-specific measures are designed to evaluate the impact of a particular condition and its treatment on individuals over time (Juniper, 1998). For the purpose of this study, the research reports on health-related quality of life (generic and disease specific) of adolescents with asthma, adolescents with GAD and adolescents with co-existing asthma and anxiety disorders are presented..

Asthma: Generic Health-Related Quality of Life

Several studies have shown that children and adolescents with asthma compared with healthy adolescents have a significantly lower health-related quality of life (Forrest, Starfield, Riley, & Kang, 1997; Hallstrand, Curtis, Aitken, & Sullivan, 2003; Sawyer

et al., 2004). Limited comparisons have been made of the health-related quality of life of adolescents with asthma and other chronic diseases. Sawyer et al. studied 123 youth aged 10 to 16 years and reported that adolescents with asthma compared with adolescents with diabetes have a significantly higher health-related quality of life. They also found that children with a chronic illness (asthma, diabetes, or cystic fibrosis) perceived their health-related quality of life as lower than those in a healthy community sample (Sawyer et al., 2004).

Asthma-Specific Quality of Life and Asthma

The results of studies show a number of clinical variables and demographics are associated with asthma-specific quality of life. Three studies report Asthma-specific Quality of Life discriminates between youth with different asthma severity. The more severe the asthma, the worse the perceived quality of life is (Annett et al., 2001; Juniper et al., 1996; Warschburger et al., 2004). By contrast, Vila et al. (2003) found no relationship between asthma-specific quality of life and asthma severity. Vila et al. speculated that even though the children in his study had severe asthma, the symptoms were well controlled, decreasing the potential impact of asthma severity on asthma-specific quality of life as the asthma-specific quality of life instrument used in his study assesses only the impact of asthma symptoms in the past week. Differences between findings on the relationship between asthma-specific quality of life and asthma severity may be due to differences in definitions and measures of asthma severity used in the studies.

Asthma specific quality of life has also been shown to be positively related to length of time since being diagnosed with asthma (Erickson et al., 2002; Warschburger

et al., 2004). It is likely that over time individuals adapt to dealing with asthma so that it has less of a perceived impact on their daily lives.

One study of adolescents with asthma reported females compared to males reported significantly lower asthma-specific quality of life independent of disease severity (Warschburger et al., 2004). This finding is congruent with gender differences in asthma specific quality of life reported in the adult literature (for a review see Schmier, Kitty, Chan, Leidy, 1998).

GAD and Quality of Life

In the adult population, GAD causes major impairment, affecting one's social life, feelings of satisfaction with life, in addition to decreasing the ability to cope effectively with small stressors (Brantley, Mehan, Ames & Jones, 1999; Massion, Warshaw & Keller, 1993). There has been no research on the quality of life of adolescents with GAD. Currently, there is also no GAD-specific quality of life measure. However there is one report on the quality of life of seniors with GAD. Wetherell et al. (2004) examined the health-related quality of life of 39 older adults with psychiatric comorbidities, compared to a control sample of 32 and a sample from another study of 36 older adults with GAD and found that the GAD group showed greater impairment in their role functioning, feelings of general health, feelings of vitality, and social functioning when compared with a healthy control group. Wetherell et al., did not identify the age range of his sample. In addition, Stein and Heimberg (2004) found that GAD decreased the participants' satisfaction with both their relationships and their activities and that adults with GAD also described a poorer sense of well-being than did the healthy participants in their study.

Asthma-Specific Quality of Life in Adolescents With Asthma and Co-existing Anxiety Disorders

Only one study was found in the published literature in which the asthma-specific quality of life was examined in a population of youth with co-existing asthma and anxiety disorders (Vila et al., 2003). The sample included 100 adolescents between the ages of 12 and 19 years who were being treated as outpatients for asthma. The adolescents in this study were given a battery of self-administered questionnaires to determine if the adolescents had an emotional disorder. The results demonstrated those who screened positively for a co-existing emotional disorder(s) compared to youth who screened negative have significantly lower asthma-specific quality of life. As well, they determined that there was a relationship between the self-esteem of the youth, their anxiety, and how much they internalized their problems. A limitation of this study was that a definitive diagnosis of which emotional disorders the youth had was not made.

In summary, asthma is a common chronic illness that has a negative impact on the generic and disease specific health related quality of life of the adolescents who suffer from it. There are high rates of comorbid anxiety disorders in youth with asthma. Of the anxiety disorders, GAD is the most prevalent among youth with asthma. The diagnostic criteria for GAD have only recently changed to include adolescents and children, which has resulted in little current research on adolescents with GAD. In order to be diagnosed with GAD, the youth must identify symptoms that interfere with their daily lives. There are no current studies in the published literature that have examined the impact of co-existing asthma and GAD on the asthma-specific quality of life of adolescents, or that have examined GAD-specific quality of life in adolescents with GAD.

Significance of the Study

Adolescents have unique developmental tasks that affect their perceptions of how asthma impacts their daily life. To effectively treat this population, it is important to examine how illnesses affect their well-being from their perspective; and to understand the effectiveness of treatment, it is necessary first to understand the impact of the illness on the individual's quality of life.

Research on the effects of GAD and asthma on the asthma-specific quality of life of adolescents is scarce. This study will help to create a better understanding of the impact of these two illnesses on the asthma-specific quality of life of these youth.

CHAPTER 3:

METHOD

This study involved a secondary analysis of a subset of data collected in a larger study called the A-A-AD Project (Screening and **A**ssessing **A**dolescents with **A**sthma for **A**nxiety **D**isorders; Ross, Davis, & Hogg, 2005). A brief description of the design, sample, and procedures of the larger study is presented first, followed by a description of the sample, the instruments, and the data analysis that was undertaken to address the objectives of this study.

A-A-AD Project

The purpose of the A-A-AD Project was to evaluate a two-stage case identification strategy designed to permit early detection and diagnosis of anxiety disorders in the population of adolescents with asthma. The specific objectives of the project were (a) to evaluate and compare the utility of self-report and parent-report measures as screening instruments for anxiety disorders in adolescents with asthma, (b) to determine the accuracy of anxiety disorder diagnoses formulated by trained nurses using a structured clinical interview, and (c) to determine the prevalence of *DSM-IV* defined anxiety disorders in a sample of adolescents with asthma.

A-A-AD Project Sample

Included in the A-A-AD Project were 53 adolescents, 27 females and 26 males, age range 12-18, mean age 14.66 $\pm$ 1.75 years, who met the following inclusion criteria: (a) objective evidence of asthma, based on the Canadian Consensus Guidelines (Boulet et al., 1999); (b) no other major medical problems (e.g., insulin dependent diabetes); (c) treatment for an acute asthma episode in an Emergency Department in the year

preceding the study; and (d) residence in the Capital Health Region. Enrollment of these adolescent participants involved the following three-stage procedure: (a) *identification of potential participants*: Medical Records Librarians at four acute care hospitals within the Capital Health Region accessed their computerized records to generate lists containing the names and telephone numbers of all adolescents, aged 12-18, who had received Emergency treatment for an acute asthma episode at their respective hospital during the preceding year, and then forwarded their lists to staff members employed in the Emergency Departments of the hospitals; (b) *access permission:* The four Emergency Department staff members called the telephone numbers on their lists, asked to speak to one of the parents, and, after identifying themselves as Emergency Department members, briefly described the study and who was conducting it, and determined whether the parent would be willing to receive a telephone call from a nurse-researcher regarding his/her possible participation in the study; (c) *enrollment and informed consent:* The names and telephone numbers of the parents who provided access permission were forwarded to a research-nurse, who telephoned each parent, explained the study, addressed any questions and/or concerns, and invited the parent and his/her adolescent to participate. Parents and adolescents who consented to participate in the study were scheduled to attend the University of Alberta Faculty of Nursing Health Centre for an assessment appointment at their earliest convenience. At the time of their arrival for the assessment, the nurse-researcher provided the adolescent and his/her parent(s) with a further opportunity to discuss the study and then obtained their written consent before initiating the assessment (see Appendices A and B).

A-A-AD Project Assessment Procedure

Each adolescent enrolled in the A-A-AD Project was evaluated by means of a two-stage assessment procedure that involved the separate, but simultaneous, participation of both the adolescent and his/her parent(s) (see Table 2). The adolescent and parent were interviewed in random order during the study (Please note: this author served as one of four nurse researchers who conducted the Anxiety Disorders Interviews during the A-A-AD Project.).

Table 2

The A-A-AD Project Assessment Procedure

Stage	Participant	Assessment strategy
1	Adolescent	Completes three self-report scales administered by a Research Assistant in Interview Room 2: Pediatric Asthma Quality of Life Questionnaire, State Trait Anxiety Inventory for Children, Multiphase Anxiety Scale for Children, Child Depression Inventory
	Parent	Participates in Anxiety Disorders Interview for *DSM-IV*: Parent Version conducted by Nurse Researcher in Interview Room 1
2	Adolescent	Participates in Anxiety Disorders Interview for *DSM-IV*: Child Version conducted by Nurse Researcher in Interview Room 2
	Parent	Completes two parent-report scales administered by Research Assistant in Interview Room 1: Asthma History Questionnaire, Pediatric Asthma Caregiver's Quality of Life Questionnaire

A summary of the results of the assessment procedure utilized in the A-A-AD Project is presented in Table 3.

Table 3

Prevalence of Anxiety Disorders in a Community-Based Sample of Adolescents With Asthma

	Male		Female		Total	
Primary diagnosis	n	%	n	%	n	%
No anxiety disorder	21	78	11	42	32	60
Anxiety disorder[a]	6	22	15	58	21	40
Post Traumatic Stress Disorder	0	0	3	20	3	14
Generalized Anxiety Disorder	3	50	9	60	12	57
Social Anxiety Disorder	0	0	2	13	2	10
Specific Phobia	2	34	1	7	3	14
Separation Anxiety Disorder	1	16	0	0	1	5

[a]No participants received a primary diagnosis of Panic Disorder, Agoraphobia or Acute Stress Disorder.

Thesis Project

Design and Sample

A comparative-descriptive design was used to address the study objectives. The main objective of the study was to compare the asthma-specific quality of life of two groups of adolescents with asthma: adolescents with asthma and adolescents with asthma and co-existing GAD. The second objective of the study was to examine the GAD-specific quality of life of adolescents with asthma and co-existing GAD. The third objective was to examine the relationship between asthma-specific quality of life and GAD-specific quality of life of adolescents with asthma and co-existing GAD. To meet

these objectives, a secondary analysis was performed on the quality-of-life data of two sub-groups of participants enrolled in the A-A-AD Project. The first group consisted of the 12 adolescents with asthma in the A-A-AD Project who received a primary *DSM-IV* diagnosis of GAD (Asthma-GAD Group) (see Table 2). The second group consisted of 12 adolescents with asthma, but no co-existing anxiety disorder who were matched on age and gender with the participants in the first group (Asthma Group). The adolescents in the Asthma Group were selected from the 32 adolescents with asthma who were enrolled in the A-A-AD Project, who did not have anxiety disorder (see Table 2).

Instruments

Two disease-specific quality of life measures were used to meet the objectives of this study: (1) the Pediatric Asthma Quality of Life Questionnaire was used to measure the asthma-specific quality of life of participants in the Asthma-GAD and Asthma Groups and (2) the GAD Interference Question from the Anxiety Disorders Interview for DSM-IV: Child Version was used to measure the GAD-specific quality of life of the participants in the Asthma-GAD and Asthma Groups.

The Pediatric Asthma Quality of Life Questionnaire

The Pediatric Asthma Quality of Life Questionnaire (PAQLQ) was designed to measure asthma-specific quality of life of children and adolescents aged 7-17 years (Juniper, 2001; Juniper et al., 1996). The PAQLQ is comprised of 23 items in three domains: symptoms (10 items), activity limitations (5 items), and emotional functioning (8 items). Adolescents are instructed to think about how their asthma has bothered them during the past week and to use a 7-point Likert type scale (where 1 indicates the *maximum impairment* in an area, and a rating of 7 indicates *no concerns*) to respond to

each item. Three of the items in the activity limitations domain are individualized (Juniper, 2001). Adolescents are asked to identify activities that they do regularly and to rate the extent to which asthma has bothered them while they were engaging in those activities. Four mean scores ranging from 1 to 7 are recorded for each adolescent: the total PAQLQ mean score for all items and the mean score on each of the three domains (Warschburger et al., 2004).

Reliability and validity. The PAQLQ was developed using a sample of 100 children and adolescents who were asked to identify the areas in which asthma most impacted their quality of life (Juniper et al., 1996). Juniper, Guyatt, Feeny, Griffith, and Ferrie (1997) demonstrated that the PAQLQ has cross-sectional validity and can be answered accurately by youth aged 7 to 17 years. The PAQLQ is commonly used in clinical research examining the asthma-specific quality of life of youth (see Annett et al., 2001; Juniper et al., 1997; Okelo et al., 2004; Raat et al., 2005; Warschburger et al., 2004).

In 1996 Juniper et al., published a study that examined the reliability of the PAQLQ across participants aged 10 to 17 years with stable asthma. The Intraclass Correlation Coefficients were 0.95 for the total scores, symptom scores were 0.93, activity limitations were 0.84, and emotional functioning was 0.89. Furthermore, in the Spanish version of the PAQLQ, the Cronbach's alpha was 0.95 for the total domain scores, 0.91 for the symptoms, 0.86 for the activity limitations, and 0.89 for emotional functioning (Tauler et al., 2001). In this secondary analysis the Cronbach's alpha was 0.97.

GAD Interference Question from the Anxiety Disorders Interview for DSM-IV: Child Version

The Anxiety Disorders Interview Schedules for DSM-IV: Child and Parent Versions (*ADIS-IV:C*; *ADIS-IV:P*; Silverman & Albano, 1996) are structured diagnostic interviews designed to allow clinicians to establish accurate and reliable diagnoses of anxiety disorders in youth 6 to 17 years of age, as well as screening for substance abuse, psychosis, selective mutism, eating disorders, and specific developmental and learning disorders of childhood and adolescence. The *ADIS:C* and *ADIS:P* interviews are administered separately by the same clinician who then formulates diagnoses based on the information from the Parent and Child interviews to form a "composite diagnosis" or a "profile of diagnoses" (i.e., in those cases involving comorbid anxiety disorders) and associated clinical severity (impairment) ratings. The *ADIS* has good interrater reliability ($r = 0.98$ for the parent interview and $r = 0.93$ for the child interview; Silverman & Nelles, 1998) and retest reliability (e.g., $k = 0.76$ for the parent interview; Silverman & Eisen, 1992), and it has shown sensitivity to treatment effects in studies of youth with anxiety disorders (e.g., Dadds, Heard, & Rapee, 1992; Kendall et al., 1997). Psychometric properties of the DSM-IV version of the instrument have shown excellent results (Silverman, Saavedra, & Pina, 2001).

A true benefit of the *ADIS-IV* over other available semi-structured interviews is its clear and detailed sections evaluating each of the anxiety disorders individually. It is important to note that an impairment rating is obtained for each anxiety disorder diagnosis. This rating (which ranges from 0 to 8) enables the interviewer to determine if the anxiety disorder causes clinically significant distress or impairment in school,

occupational, or other important areas of functioning (please note: a rating of 4 or more is required to assign an anxiety disorder diagnosis). To elaborate briefly, once the interviewer has ascertained that all of the symptom criteria for a given disorder are met, the interviewer then asks the respondent (parent or child) the following interference question (Silverman & Albano, 1996):

> Child: Okay, I want to know how much you feel this problem (i.e., excessive, uncontrolled worry) has messed things up in your life. How much has it messed things up for you with your friends, in school, or at home? How much does it stop you from doing things you would like to do? Tell me how much by using the feelings thermometer we discussed earlier, okay? (*ADIS-IV:C*; Silverman & Albano, 1996, p. 44)

> Parent: Now, I want to find out how much this problem interferes with your child's life. That is, how much has it interfered with your child's friendships, caused problems at school or at home, and stopped your child from doing the things (he or she) would like to do? If you could rate the degree of interference from 0 to 8, where 0 is *Not at all* and 4 is *Some* and 8 is *Very, very much*, what would you say? (*ADIS-IV:P*; Silverman & Albano, 1996, p. 42)

For the purposes of this study the GAD impairment rating provided by the child during the *ADIS-IV:C* interview was used to measure his/her GAD-specific quality of life.

Data Preparation and Analysis

The Statistical Package for Social Sciences (SPSS) program was used for all analyses. Descriptive statistics were used to summarize all demographic, clinical, and quality-of-life data by group. The descriptive statistics included means, standard deviations, ranges, frequencies, and percentage. Inferential statistics were used to compare the two groups (Asthma Group and Asthma-GAD Group) for equivalency on demographic (number of siblings, education of parents, family income) and clinical variables (spirometry testing, family history of asthma, seasonal asthma, history of

eczema, smoking in home, pets in home, medications, and asthma control). The dependent *t*-test was used to make comparisons on continuous variables (PAQLQ scores). Chi-square or Fischer's exact procedures were used to make group comparisons on discrete data. Where there were insufficient numbers in some cells, categories were further collapsed to examine group equivalency.

Parametric and nonparametric analyses were used to address the main objectives of the study. To compare the Asthma and Asthma-GAD Groups on the asthma-specific quality of life (objective 1), the mean group scores for the total and the domain scores (symptoms, activities, and emotion) of the PAQLQ were compared using the dependent *t*-test and the Wilcoxon Signed Ranks Test. Descriptive statistics including the mean, standard deviation (SD), and range of the GAD interference scores on the *ADIS-IV:C* were used to describe the GAD-specific quality of life of adolescents in the Asthma-GAD Group (objective 2). A series of Wilcoxon Matched Pairs Signed Rank tests were run to examine the relationship between the ranking on the asthma-specific quality of life and GAD-specific quality of life of the adolescents in the Asthma-GAD and Asthma Groups (objective 3). In this series of analyses the rank of the adolescent's score on the GAD Interference Question from the *ADIS-IV:C* was compared to his/her rank on the total PAQLQ and each of the three domains (symptoms, activities, and emotion). The alpha was set at 0.05.

Ethical Considerations

In this secondary analysis there were no known risks to the participants and their parents. At the initial interview for the A-A-AD Project, the participants were informed of the purpose of the study. Prior to beginning the interviews, they were also provided

with an opportunity to discuss the purpose of the study and ask questions. Before starting the interviews, all parents and adolescents signed consent and assent forms that included permission to use the data gathered in future studies; and before beginning this secondary data analysis, a letter of ethics approval was received from the Ethics Review Board at the University of Alberta.

Confidentiality and anonymity were protected in a number of ways. First, all identifying material gathered in the interview were excluded from the data analysis. Each case was coded with a number, and that number was used to identify the data. Second, all data were summarized into group data; thus no individually identifiable material was left in the data analysis and findings. Third, no contact was made with the participants from the original study. Finally, the primary researchers kept all questionnaires from the A-A-AD Project in locked storage (filing cabinets).

CHAPTER 4:

RESULTS

The study findings are presented as follows: (a) the demographic and asthma history and management characteristics of the participants by group are summarized, (b) the results of group comparisons for equivalency on key demographic and clinical variables are reported, and (c) the results of statistical analyses to address the three objectives of the study are presented.

Participants by Group

Included in the study were 24 adolescents with asthma, 6 males and 18 females, age range 12-18 years, mean age 14±2.1 years. Twelve of the adolescents had co-existing GAD and were matched by age and gender with the 12 adolescents without a co-existing anxiety disorder to yield two groups: the Asthma-GAD Group and the Asthma Group. The case number, age, gender, and diagnoses of the matched pairs in each group are presented in Table 4. It is important to note that because of the limited sample size it was necessary to match two 12 year-olds in the Asthma-GAD Group with two 13 year-olds in the Asthma Group (i.e., matched pairs 9 and 12). As can also be noted from Table 4, all the adolescents in the Asthma-GAD Group had one or more additional DSM-IV comorbid diagnoses; with Social Anxiety Disorder, Major Depression, and Specific Phobias being the most common.

Table 4

The Age and Gender of the Matched Pairs in the Asthma and Asthma-GAD Groups and the Comorbid DSM-IV Diagnoses of Participants in the Asthma-GAD Group

	Asthma Group		Asthma-GAD Group		
Matched pairs	Age	Gender	Age	Gender	Comorbid *DSM-IV* diagnoses
1	14	f	14	f	GAD, Social Anxiety Disorder, Eating Disorder*
2	18	f	18	f	GAD, Major Depression, Social Anxiety Disorder, Dysthymia
3	13	m	13	m	GAD, Specific Phobia, Dysthymia
4	13	f	13	f	GAD, Social Anxiety Disorder, Specific Phobia
5	13	f	13	f	GAD, Post Traumatic Stress Disorder, Major Depression, Social Anxiety Disorder
6	15	f	15	f	GAD, Major Depression, Specific Phobia, Social Anxiety Disorder, Dysthymia
7	13	f	13	f	GAD, Social Anxiety Disorder, Specific Phobia, Eating Disorder*
8	16	f	16	f	GAD, Major Depression, Dysthymia
9	13	f	12	f	GAD, Major Depression, Separation Anxiety Disorder, Social Anxiety Disorder, Specific Phobia
10	17	m	17	m	GAD, Dysthymia
11	18	f	18	f	GAD, Major Depression, Post Traumatic Stress Disorder, Specific Phobia
12	13	m	12	m	GAD, Major Depression, Social Anxiety Disorder

Note. f = female; m = male; GAD = Generalized Anxiety Disorder. * Indicates a positive screen for an Eating Disorder.

Tables 5 and 6 present summaries of the demographic and asthma history and management characteristics of the adolescent participants by group.

Table 5

Demographic Characteristics of the Asthma and Asthma-GAD Groups

Demographic characteristics	Asthma Group n = 12 f(%)	Asthma-GAD Group n = 12 f(%)
Siblings in home[a]		
One or less	10 (91)	8 (73)
Two or more	1 (9)	3 (27)
Education of mother		
High school or less	4 (33)	3 (25)
Postsecondary education	8 (67)	9 (75)
Education of father[b]		
High school or less	2 (17)	2 (20)
Postsecondary education	10 (83)	8 (80)
Family income[b]		
<30,000	0 (0)	0 (0)
31-50,000	1 (9)	4 (36)
51-70,000	4 (36)	1 (9)
>71,000	6 (55)	6 (55)

[a]Missing data from one case in the Asthma Group and the Asthma and GAD Group. [b]Missing data from two cases in the Asthma Group and the GAD Group.

Table 6

Asthma History and Management Characteristics of Participants in the Asthma and Asthma-GAD Groups

Asthma history and management characteristic	Asthma Group (n = 12) f(%)	Asthma-GAD Group (n = 12) f(%)
Spirometry testing[a]	5 (56)	7 (78)
Family history of asthma[a]	5 (56)	5 (56)
Seasonal asthma[a]	7 (78)	6 (67)
History of eczema[a]	2 (22)	4 (44)
Smoking in home[a]	2 (22)	4 (44)
Pets in home[a]	6 (67)	7 (78)
Asthma medications		
Short-acting dilators	9 (75)	12 (100)
Long-acting dilators	1 (8)	0 (0)
Inhaled steroids	4 (33)	6 (50)
Combination	3 (25)	1 (8)
Other	5 (42)	3 (25)
Asthma control	5 (42)	3 (25)
Mean asthma duration in years (SD)	10.63 (3.86)	10.96 (4.44)

[a]Three missing responses from each clinical group. Asthma control: ≥ 4 symptom-free days per week; no night awakenings for asthma.

Group Equivalency

Inferential statistics were used to determine whether the Asthma-GAD and Asthma Groups were equivalent from the standpoint of demographic and asthma history and management characteristics. Table 7 presents the results of comparisons of the Asthma and Asthma-GAD Groups on the demographic variables of siblings in the home,

education of the mother, education of the father, and family income. None of these comparisons show significant group differences.

Table 7

Summaries of the statistical Comparison of the for the Asthma and Asthma-GAD Groups on Demographic Characteristics

Demographic characteristic	X^2	p
Siblings in home[a]	1.22	0.27
One or less		
Two or more		
Education of mother	0.10	0.75
High school or less		
Postsecondary education		
Education of father[b]	0.10	0.75
High school or less		
Postsecondary education		
Family income[b]	4.34	0.11
<30,000		
31-50,000		
51-70,000		
>71,000		

[a]Missing data from one case in the Asthma Group and the Asthma and GAD Group. [b]Missing data from two cases in the asthma and GAD group. Level of significance, $p \leq 0.05$.

Table 8 presents the results of comparisons of the Asthma and Asthma-GAD Groups on the clinical variables of spirometry testing, family history of asthma, seasonal asthma, family history of asthma, seasonal asthma, history of eczema, smoking in the home, pets in the home, medications, and asthma control. None of these comparisons showed significant group differences.

Table 8

Summaries of the Statistical Comparison Participants of the Asthma and Asthma-GAD Groups on Asthma History and Management Characteristics

Asthma history and management characteristic	Test statistic	P
Spirometry testing[a]	$X^2 = 1.00$	0.32
Family history of asthma[a]	$X^2 = 0.53$	0.77
Seasonal asthma[a]	$X^2 = 0.28$	0.56
History of eczema[a]	$X^2 = 1.00$	0.32
Smoking in home[a]	$X^2 = 1.00$	0.32
Pets in home[a]	$X^2 = 0.28$	0.56
Asthma medications		
Short-acting dilators	$X^2 = 3.43$	0.56
Long-acting dilators	$X^2 = 1.04$	0.31
Inhaled steroids	$X^2 = 0.69$	0.41
Combination	$X^2 = 1.20$	0.27
Other	$X^2 = 2.54$	0.28
Asthma control	$X^2 = 0.75$	0.39
Mean asthma duration in years(SD)	$t_{(11)} = 0.20$	0.85

[a]Three missing responses from each clinical group. Asthma control: ≥ 4 symptom-free days per week; no night awakenings for asthma.

In light of the foregoing analyses, it can be concluded that the Asthma and Asthma-GAD Groups were equivalent from the standpoint of demographic, asthma history, and asthma management characteristics and therefore any quality-of-life differences between the two groups cannot be attributed to these variables.

Results by Study Objectives

The results of the analyses that were used to address the three objectives of the study are presented next.

Objective 1: Comparison of the Asthma-Specific Quality of Life of the Asthma and Asthma-GAD Groups

The total PAQLQ mean scores and the specific domain mean scores for the Asthma and Asthma-GAD Groups are presented in Table 9. As can be seen in Table 9, when dependent t-tests were employed, the Asthma and the Asthma-GAD Groups did not significantly differ on the PAQLQ total mean score or on the mean scores of the domains (symptoms, activities, and emotion).

Table 9

Summary of the Means, Standard Deviations and Statistical Comparisons on the PAQLQ for the Asthma and Asthma-GAD Groups

PAQLQ measure	Asthma Group	Asthma-GAD Group	Test Statistic			
	Mean(SD)	Mean(SD)	$t_{(11)}$	p	W	p
Total mean	5.14 (1.78)	4.00 (1.55)	-1.89	0.09	-1.81	0.07
Domain means						
Symptom	5.10 (1.14)	3.87 (1.61)	-1.98	0.07	-1.81	0.07
Activity	4.48 (1.56)	3.55 (1.56)	-1.28	0.23	-1.18	0.24
Emotion	5.57 (1.13)	4.41 (1.67)	-1.98	0.73	-1.81	0.07

Note. SD = standard deviation; t = t tests; W = Wilcoxon signed rank test scores.

Given the small sample size, a nonparametric Wilcoxon Signed Rank Test was also used to compare the groups on the total score and the domain scores of the PAQLQ and to validate the results of the dependent t-tests. As shown in Table 9, the results of the nonparametric analyses confirmed the nonsignificant findings obtained using parametric statistics. Taken together, these findings reveal that having GAD did not impact the asthma-specific quality of life experienced by adolescents in the Asthma-GAD Group.

Objective 2: Description of the GAD-Specific Quality of Life of Participants in the Asthma-GAD Group

The GAD Interference ratings provided by the adolescents in the Asthma-GAD Group at the time of their *ADIS:C* interview are included in Table 10. As can be noted,

the GAD Interference ratings ranged from 1 (*a little bit*) to 8 (*very, very much*), revealing large variability in the GAD-specific quality of life experienced by these adolescents. The mean, median, and mode of these GAD interference ratings was 5.35 (SD $\pm$ 2.09), 6, and 4, respectively.

As noted in Table 10, all of the adolescents except one self-rated 4 or above on GAD interference, which indicates that GAD definitely "messed things up" in their lives. The one adolescent who self-rated her GAD interference at 1 (i.e., case #5) gave an interference rating of 1 for all of the anxiety disorders with which she was diagnosed. Her parent, in contrast, gave this adolescent very high interference ratings on all of her disorders. Given the magnitude of the anxiety symptomatology reported by this adolescent and the severity of her parent's interference ratings, it is reasonable to suggest that this adolescent may have "minimized" her anxiety disorder interference ratings.

Objective 3: The Relationship Between Asthma-Specific and GAD-Specific Quality of Life of the Participants in the Asthma-GAD Group

Table 10 presents a summary of the asthma-specific and GAD-specific quality of life scores of the adolescents in the Asthma-GAD Group. In order to determine the relationship between their asthma-specific and GAD-specific quality of life, a series of Wilcoxon Signed Rank analyses were conducted. The results of these Wilcoxon Signed Rank analyses showed no significant relationship between the rank of the scores of participants on GAD interference and the rank of their scores on the total mean PAQLQ ($Z = -1.65$, $p = 0.10$) or any of the domain scores: symptoms ($Z = -1.73$, $p = 0.08$), activities ($Z = -1.87$, $p = 0.06$), or emotion ($Z = -1.1$, $p = 0.27$). Thus it would appear that adolescents with co-existing asthma and GAD perceive the quality of their life

differently, depending on whether they are focused on their asthma or their GAD, and that these different quality of life experiences are unrelated.

Table 10

Summary of Asthma-Specific and GAD-Specific Quality of Life Data for the Participants in the Asthma-GAD Group

Participant Case	PAQLQ Measures				GAD Interference Rating
	S	A	E	T	I
1	5.7	5.8	6.25	5.91	7
2	3.1	4.0	4.75	3.87	4
3	2.7	1.6	4.75	2.00	8
4	3.9	2.4	3.63	3.48	4
5	5.6	5.6	6.5	5.91	1
6	3.2	2.8	4.75	3.65	7
7	1.6	1.4	2.63	1.91	6
8	3.8	3.4	4.88	4.09	4
9	1.5	3.4	2.25	2.17	6
10	3.5	2.2	3.88	3.35	8
11	5.8	4.5	6.12	5.68	7
12	6.1	5.6	5.88	5.91	4

Note. S = mean score for symptom domain; A = mean score for activity domain; E = mean score for emotion domain; T = mean total score; I = rating on GAD interference question.

CHAPTER 5:

SUMMARY, DISCUSSION, AND IMPLICATIONS

Summary

The purpose of this study was to expand knowledge in the area of the quality of life experienced by adolescents with asthma and co-existing Generalized Anxiety Disorder (GAD). Using subjects and data from a larger study, 12 adolescents with asthma diagnosed with co-existing GAD (the Asthma-GAD Group) were matched for age and gender with 12 adolescents with asthma alone (the Asthma Group). Statistical analyses revealed that the two groups were equivalent in terms of clinical and demographic characteristics. The asthma-specific quality of life of adolescents in both groups was measured using their responses on the Pediatric Asthma Quality of Life Questionnaire (PAQLQ). The GAD-specific quality of life of the adolescents in the Asthma-GAD Group was measured using the GAD Interference Rating that they provided during a structured clinical interview. The results of statistical analyses revealed that (a) the PAQLQ differences between the Asthma and Asthma-GAD Groups were nonsignificant, (b) the Interference Ratings of the Asthma-GAD Group ranged from 1 (*a little bit*) to 8 (*very, very much*), and (c) the asthma-specific and GAD-specific quality of life of participants in the Asthma-GAD Group were unrelated.

Discussion

A discussion of the results of the three objectives in the study will be presented next.

Objective 1: Comparison of the Asthma-Specific Quality of Life of the Participants in the Asthma and Asthma-GAD Groups

The results of the statistical analyses related to this objective revealed that GAD does not significantly impact the asthma-specific quality of life of adolescents with asthma and co-existing GAD in this sample. If this is in fact the case, it is a surprising finding, as previous research involving asthma and anxiety indicates that asthma symptoms can be triggered and/or exacerbated by anxiety (for reviews see Kolbe, 2002; Lehrer, 1998; Lehrer et al., 1993; Rietveld et al., 2000). A possible explanation for this finding is that the emotional triggers may not be uniform among all individuals with asthma; that is, some individuals with asthma and a co-existing anxiety disorder may not experience anxiety as a trigger for asthma symptoms. Or perhaps because GAD involves ongoing and unresolved worry, over time the individual's body adapts to the increased arousal levels. This in fact could be why it has been found that Panic Disorder in adults exacerbates asthma, because with Panic Attacks there are periods of distinct, high anxiety and arousal.

If the results from the statistical analyses related to this objective are not true, then GAD does impact the asthma-specific quality of life of adolescents with asthma and GAD in this sample. Two possible reasons that these study findings may not be true are the small sample size and limitations with the instrument used. Indications that the sample size was too small include the following: First, the PAQLQ mean raw score on the total and on each domain were lower for the Asthma-GAD group than for the Asthma Group, which indicates that if the sample size had been larger, there may have been statistically significant differences. Second, in the larger A-A-AD Project it was found

that the adolescents with asthma and co-existing anxiety disorders experienced significantly lower asthma-specific quality of life than did the adolescents with asthma without any co-existing anxiety disorders. Third, in their recent study involving 100 adolescents with asthma, Vila et al. (2003) found that having an emotional disorder is associated with reduced asthma-specific quality of life as measured by the PAQLQ.

If the findings related to this objective are false, then another possible explanation pertains to the tool that was used to measure asthma-specific quality of life. Although the PAQLQ is an accepted instrument for measuring asthma-specific quality of life in children and adolescents, it has some weaknesses that may have impacted the results of this study. Rutishauser, Sawyer, and Bowes (1998) identified three weaknesses with the PAQLQ that are pertinent to the findings in this study. First, the PAQLQ is meant for children aged 7-17 years, which makes it difficult to capture any age-specific differences with adolescents. Second, the PAQLQ does not capture psychosocial issues. Yet among adolescents, this is an area of great importance. Adolescence is a time of physiological, psychological, and emotional growth and change. Asthma symptoms and activity limitations can increase a youth's feelings of isolation and being different at a time when, developmentally, feelings of cohesion with peer groups are important. The third weakness with the PAQLQ is adolescents ability to individually identify the physical activities in which they participate in the activities domain. This variation among the activities makes it difficult to compare adolescents in this domain because different physical activities vary in the degree of exertion, duration of the activity, and environment in which the activity takes place, all of which will impact the adolescent's

asthma (Rutishauser et al., 1998). These weaknesses with the PAQLQ may have distorted the differences between the Asthma and Asthma-GAD Groups.

Notwithstanding the fact that this study revealed no significant differences in the PAQLQ between groups, it is important to note that the scores on the PAQLQ obtained in this study (see Table 9) are lower than those in two other recent reports of PAQLQ scores in the literature (Annett et al., 2001; Raat et al., 2005). Annett et al. reported that the youth in their study with moderate asthma had total scores on the PAQLQ of 5.71, symptom scores of 5.82, activity scores of 5.71, and mean emotion scores of 6.16. These scores on the PAQLQ are all higher then those from either group in the current study, which may be related to the fact that the participants in the current study all had moderate to severe rather than moderate asthma. Raat et al. also found higher scores for their participants aged 6-18 years on the PAQLQ than for those in the current study (total mean, 6.19; symptoms mean, 6.09; activities mean, 5.67; and emotions mean, 6.66); however, the severity of the asthma was not identified in this study. The sample size in Raat et al.'s study was 238, and in Annet et al.'s study 215 youth had moderate asthma. Both of these studies had significantly larger numbers of participants, but neither looked at the quality of life of youth with anxiety disorders and asthma. In this study, PAQLQ scores may have been lower for both the asthma and Asthma-GAD Groups because of the severity of the asthma.

Warschburger et al. (2004) reported PAQLQ results in their study of 318 youth between the ages of 8 and 16 years that are very similar to the results of the Asthma-GAD Group in this study (total mean, 3.87; symptoms mean, 3.88; activities mean, 3.50; emotions mean, 4.25). One could speculate that though the majority of the participants in

this study were described as having moderate asthma, the participants' asthma was fairly severe, because most were being treated for their asthma as inpatients.

In conclusion, further research is needed to determine whether in fact there is no significant difference between asthma-specific quality of life in adolescents with asthma and adolescents with asthma and GAD or whether the findings related to this objective are not true, and in fact the PAQLQ was not able to capture the differences, or the sample size was too small to capture group differences in asthma-specific quality of life.

Objective 2: Description of the GAD-Specific Quality of Life of Participants in the Asthma-GAD Group

Within the Asthma-GAD Group, the GAD Interference rating scores ranged from 1 to 8; however, apart from the adolescent who self-rated at 1, all of the remaining adolescents rated their GAD interference between 4 and 8, which indicates that the GAD caused significant interference in the lives of these adolescents. The variation in the GAD Interference scores may have been a function of a number of factors. First, the severity of the GAD may create variability in the interference ratings because those adolescents with more severe uncontrolled worry may experience a greater impact of the GAD on their GAD-specific quality of life than do adolescents with a less severe form of the disorder.

The second factor may be related to the coping style that the adolescent has developed. Adolescents with an effective coping style may have developed more effective strategies to cope with the worry and anxiety, and hence have a lower interference rating, whereas adolescents with a less effective coping style may find that the GAD interferes more with their activities, thereby reducing their quality of life.

A third factor in the variability in the GAD-specific quality of life may be gender. Included in this study were nine females with GAD and only three males. It is not surprising that there were more females with GAD, because, according to the *DSM-IV*, two thirds of individuals with GAD are female (APA, 1994). Of the three males with GAD, two rated the interference of the GAD at 8 (66%), whereas none of the females in this study self-rated their GAD at this level of severity. The third male with GAD self-rated at 4, which indicates that the GAD is still having a significant impact on his quality of life. One possible explanation for the greater severity ratings on the GAD in the males in this sample is that in order to be accepted by one's peer group, it is important that males be both athletic and not be anxious, making the impact of the GAD greater on the lives of males in this sample.

The fourth factor is the impact of co-existing conditions. GAD is rarely found as a sole psychiatric diagnosis, and among youth there are high rates of comorbidity with depressive disorders and other anxiety disorders (Ballenger et al., 2001; Masi et al., 1999; Wagner, 2001; Wittchen, 2002). Other co-existing conditions may influence the severity of the symptoms of GAD and the overall impact on the adolescent's global quality of life. In this study all of the adolescents had at least one co-existing anxiety disorder, and some had as many as four co-existing disorders in addition to the GAD and asthma, all of which may impact the severity of the GAD.

A fifth factor for the variation in interference of GAD among the adolescents may be related to the stressors that they were experiencing at the time of the interview. Adolescents with GAD who are experiencing significant stressors in a number of areas of

their lives may be more worried and more likely to rate themselves higher on the interference rating.

In conclusion, further research is needed to determine what GAD-specific quality of life looks like in adolescents with asthma. Further research should, first, include a larger sample size to control for GAD severity and co-existing conditions. Second, future research should control for gender, either by having equal numbers of males and females in the study or by having only male or only female participants. Third, future research should screen for current stressors and coping styles in the adolescents' lives.

Objective 3: The Relationship Between Asthma-Specific and GAD-Specific Quality of Life of the Participants in the Asthma-GAD Group

The results of this study related to this objective found no significant relationship between asthma-specific quality of life and GAD-specific quality of life experienced by adolescents in this sample with co-existing asthma and GAD. If this finding is true, then the disorders co-exist, but each does not affect the prognosis of the other. This is surprising because both disorders impact multiple domains within quality of life.

If the findings of this study are false and there *is* a relationship between Asthma and GAD-specific quality of life, the relationship may not have been captured in this sample because of the high variability in responses in this sample. In fact, four relationships between asthma-specific and GAD-specific quality of life were evident in this sample of 12: (a) "good" asthma-specific quality of life and "good" GAD-specific quality of life, (b) "poor" asthma-specific quality of life and "poor" GAD-specific quality of life, (c) "poor" asthma-specific quality of life and "good" GAD-specific quality of life, and (d) "good" asthma-specific quality of life, and "poor" GAD-specific quality of life.

The question that arises from these four relationships is, Why are there four different relationships of disease-specific quality of life evident in this study? One could speculate that with the first relationship (i.e., case #12) the adolescent may have had both good coping skills and asthma that is under control. For the second relationship (i.e., case #3), the adolescent may have out-of-control asthma, poor coping skills, and numerous extraneous stressors, which have a strong negative impact on both the asthma-specific and GAD-specific quality of life. In the case of the third relationship (i.e., case #4), the adolescent may have developed good coping skills in dealing with the GAD, but may be exposed to other triggers that are impacting the asthma. In the fourth relationship (i.e., case #1), one could speculate that the poor GAD-specific quality of life may in fact be causing a secondary gain in terms of control of the asthma. Individuals with GAD worry excessively, and this could lead to hypervigilance with regard to asthma management and medication compliance, possibly even improving asthma control. If there is a relationship between asthma-specific quality of life and GAD-specific quality of life, the size of this sample may have been too small to capture the full complexity of these relationships.

In conclusion, future research with larger samples is needed to clarify the relationship between the asthma-specific and GAD-specific quality of life of adolescents with asthma and GAD. There is currently no literature on the quality of life of adolescents with asthma and GAD.

Strengths and Limitations

This study has provided an opportunity for a unique glimpse into the quality of life of adolescents with a co-existing physiological and psychological illness (asthma and

GAD), which on their own cause impairment and difficulty in the life of an adolescent. This is the first research study to examine the impact of a specific anxiety disorder, GAD, on the quality of life of adolescents. Not only did this study examine the impact of GAD on the quality of life of these adolescents, but it also focused on the adolescents' own perspectives of how the symptomatology of the GAD was affecting them by using their interference ratings from the *ADIS-IV:C* to describe their GAD-specific quality of life.

The study was limited because it involved a secondary analysis, and the sample size and instruments were determined by what was available or used in the A-A-AD Project, which had a different purpose from that of the current study. The comparison groups in this sample were small; each consisted of 12 participants, for a total of 24 participants to compare. This is, however, a commonly noted disadvantage of using a secondary analysis to examine a new variable (Polit & Beck, 2004). As Polit and Beck (1999) suggested, though, secondary analyses are both commonly used in nursing research and may provide insights into a sample different from that used for the purposes of the original study (as is the case in this study).

Implications

It is important that nurses be aware that GAD is commonly found to co-exist with asthma. If the finding that there is no difference in the quality of life of adolescents with asthma and GAD compared to adolescents with only asthma is false, nursing staff who see clients with asthma should not only be screening for anxiety disorders, but they should also be assessing quality of life. The high variability in the combinations of good and poor asthma and GAD-specific quality of life highlight the importance of disease-specific quality of life measures to be used to determine the impact of co-morbid

conditions on the individual. Education should be provided about anxiety disorders for those who deal with adolescents with asthma in asthma clinics and other professional settings where adolescents with asthma frequently receive health care services.

Further research should look at the subjective experience of adolescents living with GAD. Once a clear understanding of the experience of GAD on quality of life has been established, research should focus on the qualitative experience of adolescents who live with asthma and GAD. This qualitative research would be a good starting point to determine the impact of asthma and GAD on youth, and it might be a better way of determining which tools may be more suitable to measure quality of life in a quantitative manner in future studies. None of the previously published literature examined the quality of life of adolescents with GAD, and prior to studying the impact of co-existing disorders such as asthma and GAD, research should examine the impact of GAD on the quality of life of adolescents. Qualitative research in this area will help to improve the tools available to measure the quality of life of adolescents. Furthermore, it is important to conduct research on adolescents between the ages of 12 and 14 and 15 and18 years rather than grouping this population with children under the age of 12 or with adults to make it easier to compare the findings across studies. By further breaking down the adolescent's age groups it would be possible to account for psychological, social, emotional and developmental stages. As well, researchers who study youth with asthma should use similar rating systems to describe asthma severity, such as the Canadian Lung Association's (1999) asthma consensus guidelines, because asthma severity is an important variable that affects the asthma-specific quality of life (Boulet et al., 1999). If

future studies involving larger samples support the findings of this study, one important implication in nursing practice is that the GAD and asthma could be treated separately.

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